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Interaction Between the Two Subpsecies Groups of the Seed-Finch *Sporophila angolensis* in the Magdalena Valley, Colombia

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The Lesser or Thick-billed Seed-Finch (*Sporophila angolensis*) is a medium-sized, heavy-billed neotropical finch ranging from southern Mexico to Argentina. Although it is usually placed along with *S. crassirostris* and *S. maximiliani* in a separate genus, *Oryzoborus*, I have given reasons elsewhere for synonymizing *Oryzoborus* with *Sporophila* and have also discussed subspecific variation in *S. angolensis* (Olson in press). Within *S. angolensis* there are two subspecies groups, long considered separate species, that differ in the adult male plumage. In the *funerea* group, found from southern Mexico through Middle America to Colombia and Ecuador west of the Andes, the adult males are entirely black below, whereas in the *angolensis* group, found in most of tropical South America east of the Andes, the belly and flanks are deep chestnut, sharply contrasting with the black breast.

The nature of the interaction between these two subspecies groups has hitherto not been understood. Meyer de Schauensee (1951: 1094) noted adult male specimens of *funerea* from Guatemala, Honduras, Panama, and the Santa Marta region of Colombia that had "traces to a considerable amount of chestnut on the belly, clearly showing their affinity to *O. angolensis*." Wetmore (1957: 103) preferred to regard the two forms as separate species, and he considered the exceptional specimens of *funerea* as expressing a "deep-seated character that indicates ancient relationship to *angolensis* through some common ancestral stem." As evidence, he cited the fact that the aberrant birds appeared to occur at random rather than being "restricted to the area where the two styles of color pattern are in contact."

In revising the subspecies of *S. angolensis*, I examined most of the specimens available in North American museums. Apart from birds taken in the Magdalena Valley and the Santa Marta region, Colombia, I found that almost all of the adult male specimens of *funerea* that showed some chestnut in the belly were individuals that retained feathers from the preceding subadult plumage. Subadult males are more intensely colored than females, and some of the subspecies (e.g. *salvini* and *aethiops*) are quite chestnut in the female and subadult plumages, so that any of these feathers retained in the definitive male plumage would appear to be nearly as chestnut as in the *angolensis* group. I have seen only one specimen from outside the Magdalena Valley and Santa Marta in which the chestnut intermingled with black did not appear to be retained from the subadult plumage (USNM 449335, Soná, Veraguas, Panamá). Even an occasional female specimen in the *funerea* group may have a sprinkling of decidedly chestnut feathers in the belly (e.g. USNM 403899, Valdívia, Antioquia, Colombia; CM 42219, Minca, Santa Marta, Colombia).

There are specimens from the Magdalena Valley, however, that I regard as definite intergrades between the *angolensis* and *funerea* subspecies groups. In these birds the black belly is distinctly suffused with chestnut, sometimes to the extent that the pattern of the *angolensis* group may be discerned, as noted by Meyer de Schauensee (1951). The distribution of these intergrades is of considerable interest (Fig. 1). Birds from the north side of the Santa Marta mountains at Chirua, La Concepción, and Pueblo Viejo are intergrades, whereas those from the western side, at Minca, are entirely black. A definite intergrade from the vicinity of San Gil, Santander is from a rather high elevation (between 500 and 1,000 m) in the valley of the Río Fonce, which ultimately flows into the Río Sogamosa, a tributary of the Magdalena. A bird from Ayacucho, Magdalena is likewise an intergrade, whereas those somewhat farther up the Magdalena Valley in Santander (Azufrada, Infantas, El Centro, Hacienda Santana) are all black, as is typical of the *funerea* group. Olivares (1969) records two specimens of this species from Cundinamarca (at Puerto Salgar and La Vega) that he referred to *funerea*, as one specimen was an entirely black adult male. It is not clear from which locality this specimen was taken and therefore the occurrence is not shown in Fig. 1.

Of considerable interest is the population from the upper Magdalena Valley in Huila (La Plata) and Tolima (Melgar), known so far only from two specimens. These birds belong to the *angolensis* group, although the chestnut underparts are a much grayer, more chocolate-brown, for which reason I have designated this population as a separate subspecies (Olson in press). This is the only population of the *angolensis* group known from west of the eastern Andes.

Although the lack or paucity of specimens from critical areas hampers any reconstruction of the past history of the two subspecies groups, two hypotheses suggest themselves. *Sporophila angolensis* is a

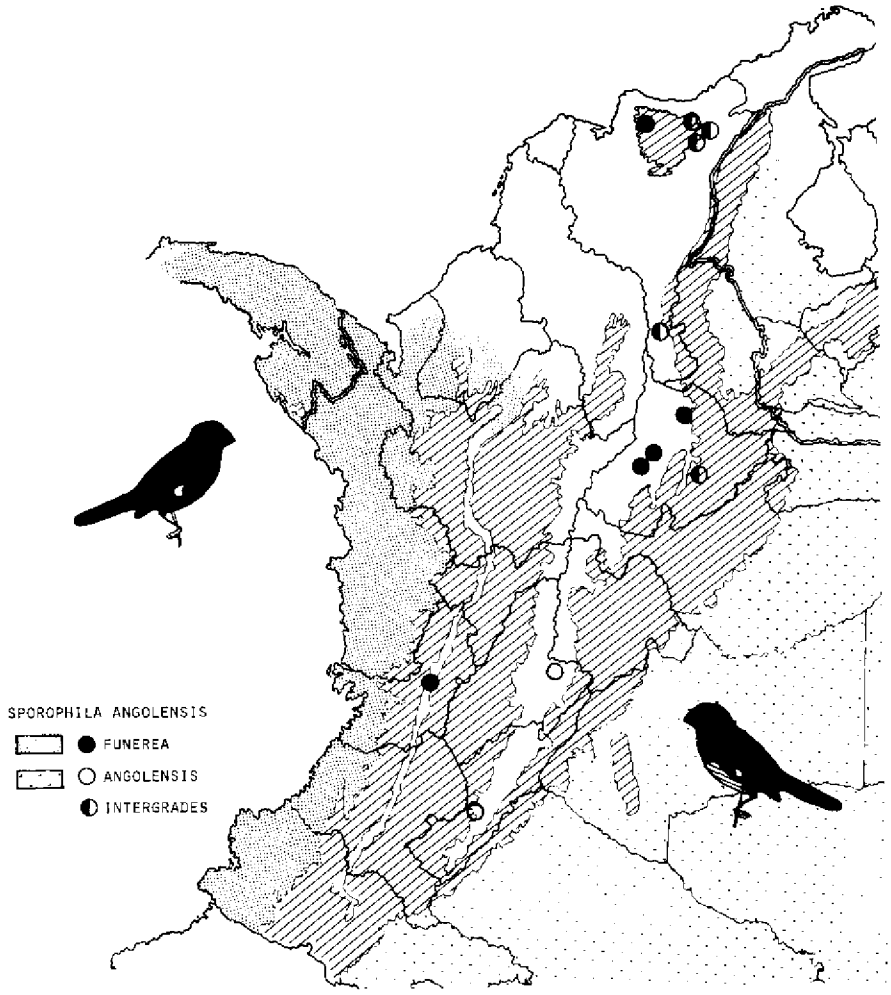

Fig. 1. Map of western Colombia and adjacent areas showing the distribution of the two subspecies groups of *Sporophila angolensis* and their intergrades. Hatched areas indicate elevations above 1,000 m. The individual of *funerea* indicated in the Cauca Valley is based on the specimen from Río Frio cited by Chapman (1917). Distribution is otherwise indicated for individual specimens only in the Magdalena Valley and Santa Marta region and elsewhere is very generalized.

species of the humid lowlands and occupies a variety of habitats, including forest edge, second growth, gallery forest, open woodland, and clearings with low bushes and shrubs, whereas it appears to be absent in truly unforested areas. Assuming that populations must have been affected by the alternating wet and dry cycles of the Pleistocene and Holocene (Haffer 1970, 1975), the species may have become separated into eastern and western components (*funerea* and *angolensis*) during an arid phase, when unforested areas could have provided a barrier. If we suppose that this barrier was somewhere to the west of the eastern Andes and that the Magdalena Valley was originally occupied only by the *angolensis* group, then the present distribution of the two forms could be explained by a subsequent invasion by *funerea*, which is intergrading with and swamping out *angolensis* but which has not proceeded as far as the upper Magdalena Valley, where a relict population of *angolensis* still persists.

Alternatively, the Eastern Andes themselves may have provided the major barrier between the two groups. Climatic or physiographic factors may have prevented *funerea* from entering the upper Magdalena Valley from the north, and *angolensis* may have entered over the low divide to the south to establish the distinctive subspecies found in the upper Magdalena Valley today. As yet, there are no

specimens from southern Cundinamarca to establish whether intergradation occurs there. If the second hypothesis is correct, the intergradation seen in the Santa Marta area and the lower Magdalena Valley would be the result of an influx of *angolensis* from Venezuela, either over or around the Serranía de Perijá. In either case, it is evident that the isolation of the *funerea* and *angolensis* subspecies groups was of insufficient duration to produce specific differentiation, and the intergradation observed in the lower Magdalena Valley justifies the current taxonomic practice of treating *S. funerea* as conspecific with *S. angolensis* (e.g. Meyer de Schausensee 1966, Paynter 1970).

Material Examined

The following specimens, used in this study, are adult males from the Magdalena Valley and Santa Marta region, Colombia that were not listed previously in my revision of the subspecies of *S. angolensis* (Olson in press). Institutional abbreviations are listed below.

Sporophila angolensis (*funerea* group).—Magdalena: Minca, 24 km southeast of Santa Marta, between La Tigrera and Cincinati (CM 42200, 42272; ANSP 63543). Santander: Azufrada (MVZ 152511); Infantas, Río La Colorada (ROM 73471); El Centro, 70°0′N, 73°45′W (ROM 73470); Hacienda Santana, 8 mi (12.8 km) northeast of Conchal on railroad to Wilches (USNM 412911–412913).

Sporophila angolensis (intergrades between *funerea* group and *angolensis* group).—Magdalena: Pueblo Viejo (CM 44847—belly richly suffused with chestnut; CM 44900—belly with only a few chestnut feathers; CM 44846 and 45014—intermediate between the two preceding specimens); Chirua (ANSP 63541–63542; CM 44917; MCZ 6138—all definite intergrades; MCZ 6138 with less chestnut, but of a more chocolate color than the others); Ayacucho, 25 km east of La Gloria (USNM 375414—abdomen heavily suffused with chestnut); El Cauca, 12 km southeast of Aguachica (CM 54809—very worn, not certainly an intergrade). Santander: Near San Gil (WFVZ uncataloged—belly heavily suffused with deep, almost maroon, chestnut).

An enigmatic specimen with a chestnut belly perfectly typical of *S. a. angolensis* (WFVZ uncataloged, collected 10 February 1968 by C. J. Marinkelle) is labelled "Restrep, Calima, Valle," which presumably refers to the village of Restrepo about 40 km north of Cali, near the head of the Río Calima. If this specimen is indeed from Valle, it would be remarkable, as this is far into the normal range of the *funerea* group. I regard as more likely, however, that the specimen is mislabelled.

Specimens used in this study were obtained from the following institutions: Academy of Natural Sciences of Philadelphia (ANSP); Carnegie Museum of Natural History, Pittsburgh (CM); Museum of Comparative Zoology, Cambridge, Massachusetts (MCZ); Museum of Vertebrate Zoology, Berkeley (MVZ), through NSF grant BMS 7200102; Royal Ontario Museum, Toronto (ROM); National Museum of Natural History, Smithsonian Institution, Washington (USNM); Western Foundation of Vertebrate Zoology, Los Angeles (WFVZ). I thank John C. Barlow, Victoria M. Dziadosz, Frank B. Gill, Ned K. Johnson, Lloyd F. Kiff, Kenneth C. Parkes, and Raymond A. Paynter, Jr., for lending specimens. I am grateful to Jurgen Haffer and Kenneth C. Parkes for their comments on the manuscript. This is contribution number 6 of the Wetmore Papers, a project supported in part by trust funds from the Smithsonian Institution for completing unfinished work and study of undescribed material left by the late Alexander Wetmore.

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